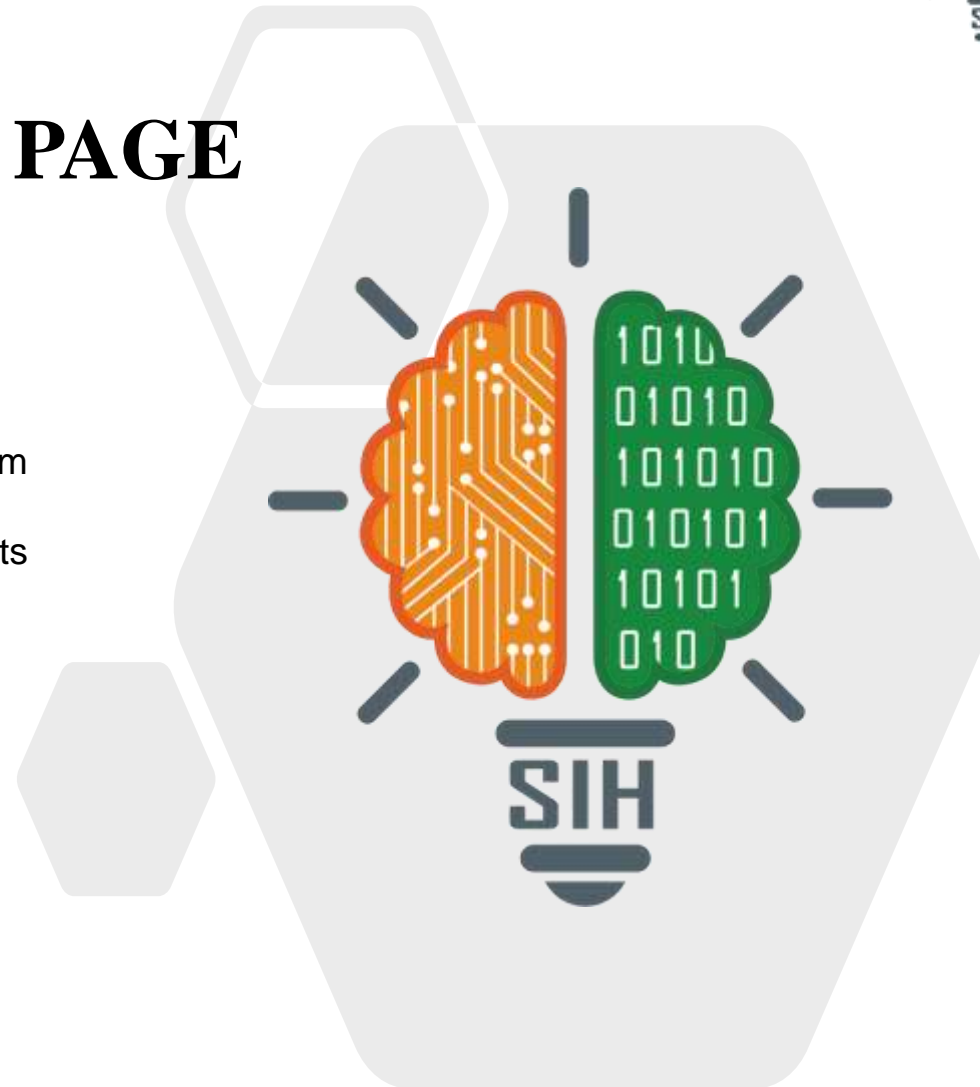


SMART INDIA HACKATHON 2025



TITLE PAGE

- **Problem Statement ID** - SIH25007
- **Problem Statement Title** - Development of a Digital Farm Management Portal for Monitoring maximum Residue Limits (MRL) and Antimicrobial Usage (AMU) in Livestock
- **Theme**- Agriculture, FoodTech & Rural Development
- **PS Category**- Software
- **Team ID**-
- **Team Name** - APEX SOLVERS



IDEA TITLE

❖ Proposed Solution

- Develop a **web + mobile portal** for digital farm management with focus on **tracking antimicrobial usage** and **predicting residue levels** in livestock products.
- **Key features:**
 - **Drug Usage Log** – record medicine type, dosage, withdrawal period.
 - **AI Drug Recommendation** – Correct dosage and withdrawal period.
 - **Residue Monitoring** – predict/track residue levels against MRL standards.
 - **Alerts & Notifications** – when thresholds are crossed.
 - **Dashboards & Reports** – per animal, farm, or region.
 - **Regulatory Compliance** – generate reports for authorities.
- Solution ensures **safe livestock produce**, reduces risk of **antimicrobial resistance (AMR)**, and promotes **food safety**.
- **Innovation and Uniqueness of the Solution**
 - **Residue Prediction Engine**
 - Uses **ML models + withdrawal period databases** to predict residue levels in animal products before they reach the market.
 - This predictive approach is **proactive** rather than reactive (current systems only detect violations after lab tests).






TECHNICAL APPROACH

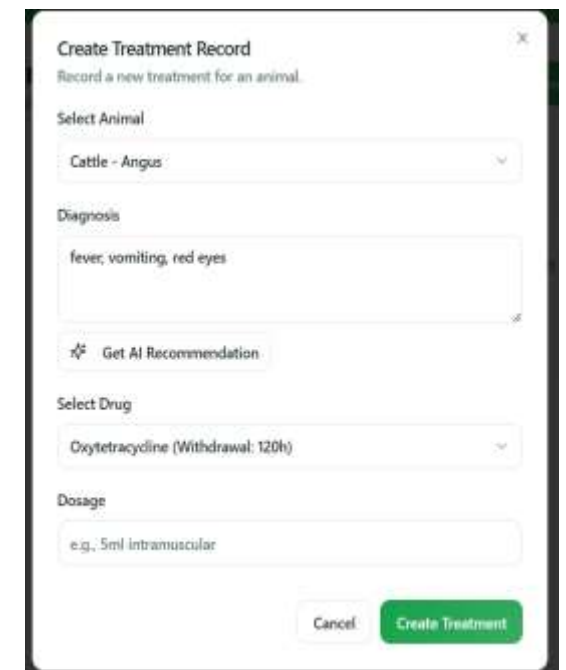
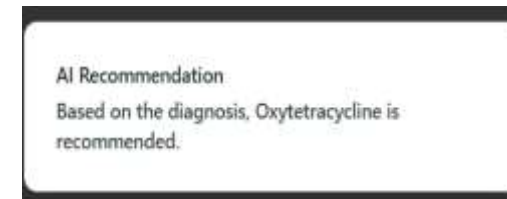


- **Architecture:**

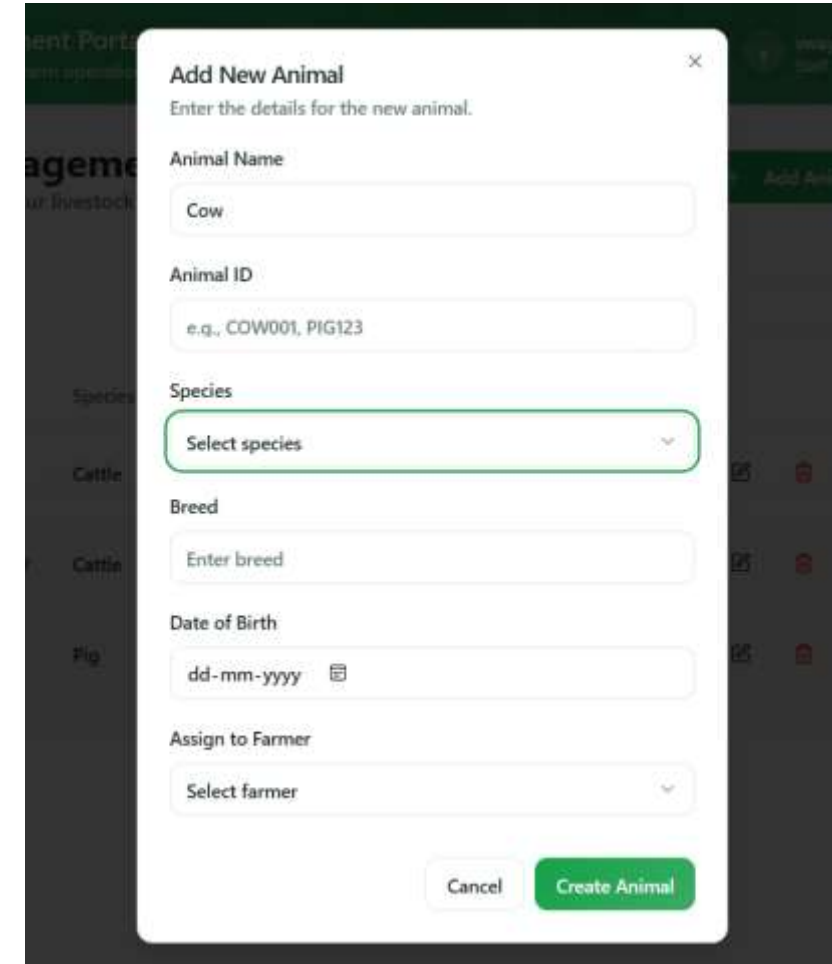
- **Input:** Farmers/vets enter AMU data; lab results uploaded.
- **Processing:** Backend validates dosage, predicts residue using rules/ML.
- **Output:** Dashboards, alerts, compliance reports.

- **Technology Stack:**

- **Frontend:** React.js (for mobile). 
- **Backend:** Node.js REST API. 
- **Database:** PostgreSQL. 
- **Analytics:** ML models for MRL prediction, visualization with PowerBI. 
- **Cloud Hosting:** AWS with offline support for low-connectivity areas. 
- **Security:** Role-based access, encrypted data storage.



- **Challenges & Risks:**
 - Farmers' digital literacy.
 - Inconsistent data entry.
 - Internet connectivity in rural areas.
 - Integration with veterinary labs.
 - Ensuring data security & privacy.
- **Mitigation Plans:**
 - Simple multilingual mobile app UI with icons.
 - Validation checks for accurate data entry.
 - Offline mode with auto-sync.
 - APIs for lab data integration.
 - Secure, role-based authentication



Add New Animal

Enter the details for the new animal.

Animal Name
Cow

Animal ID
e.g., COW001, PIG123

Species
Select species

Breed
Enter breed

Date of Birth
dd-mm-yyyy

Assign to Farmer
Select farmer

Cancel Create Animal

IMPACT AND BENEFITS



- **Farmers:** Easy tracking of medicine usage, better herd health, reduced rejection of produce
- **Consumers:** Safer food products, reduced antibiotic residues.
- **Government & Regulators:** Transparency, compliance monitoring, reliable data for policymaking.
- **Society at Large:** Contributes to fight against **antimicrobial resistance (AMR)**.
- **Economic Impact:** Higher quality exports, less loss due to rejected consignments.
- **Scalability:** Can be extended nationwide and integrated with national livestock databases.

RESEARCH AND REFERENCES



- **FAO/WHO Codex Alimentarius** – Guidelines on Maximum Residue Limits.
- ICAR & Govt. of India guidelines on AMU in livestock.
- **“National Action Plan on Antimicrobial Resistance (NAP-AMR)”** – Govt. of India.
- **Existing digital farm management tools studied:** mKRISHI, e-NAM, Kisan Suvidha.
- **SIH 2025 Problem Statement Document** – Ministry of Fisheries, Animal Husbandry & Dairying.